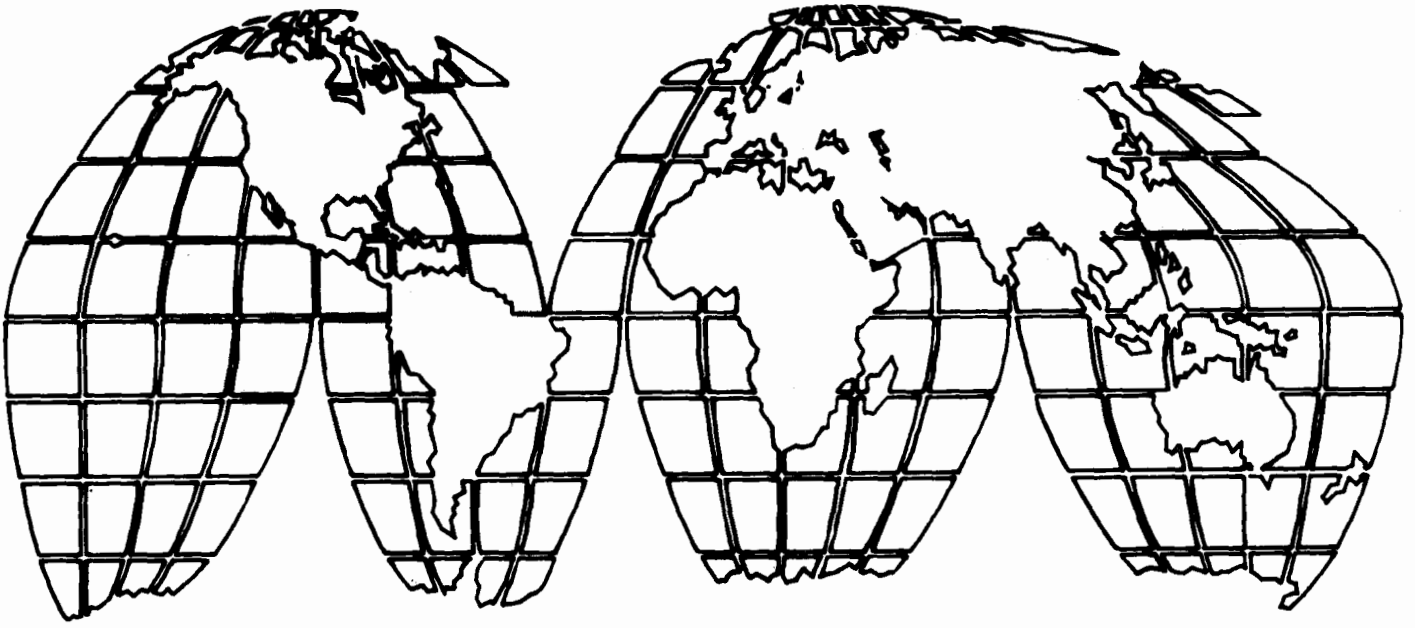
A.I.D. Project Impact Evaluation Report No. 17

Honduras Rural Roads: Old Directions and New



January 1981

Agency for International Development

PN-AAH-971

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HONDURAS RURAL ROADS

OLD DIRECTIONS AND NEW

PROJECT IMPACT EVALUATION NO. 17

by

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FOREWORD

In October 1979, the Administrator of the Agency for International Development requested that, in preparation for an Agency-wide ex post evaluation system, between twenty and thirty projects be evaluated during the subsequent year, focusing on the impact of these projects in several representative sectors of the Agency's program. These impact evaluations are to be performed by Agency personnel and result in a series of studies which, by virtue of their comparability in scope, will ensure cumulative findings of use to the Agency and the larger development community. This study of the impact of rural roads constructed under two AID projects in Honduras was undertaken as part of this effort. A final evaluation report will summarize and analyze the results of all the studies in each sector, and relate them to program, policy and design requirements.

EXECUTIVE SUMMARY

In June-July 1980, a four-member team spent three weeks in Honduras evaluating two AID rural roads loan projects--a farm-to-market feeder road loan designed in the mid-1960s and a farm access road component of an agricultural sector loan designed almost ten years later. The team concluded that the roads have generally contributed to development, but the extent and distribution of the benefits have varied greatly depending on corollary policies and economic circumstances.

Implementation

The feeder road loan, approved in 1965, provided $5.2 million to build 16 all-weather roads totalling 602 kms. By the time the project was completed in 1974, road construction consisted of four roads amounting to 113 kms. An engineering firm designed plans for nine additional roads, some of which were subsequently constructed with funding from other donors. Opportunities for local firms to bid on small contracts stimulated the formation of Honduras firms, which have since handled the bulk of the country's road construction.

The farm access roads program was a $1.75 million component of a $12 million agricultural sector loan project approved in 1974. This project was designed to support the country's agrarian reform. The loan project aimed to assist a number of selected farm groups--called "model cooperatives"--by providing credit, technical assistance, and roads connecting cooperative fields to the nearest all-weather highway. By the end of 1978, the GOH had completed the roads portion of the project (53 access roads totalling 304 kms and reaching 61 model cooperatives).

Maintenance

Judging from the team's field observations, the GOH's maintenance capability is greatly improved. Although reports in 1974 indicated deterioration of the four feeder roads, all are now passable; two were recently graded. With few exceptions, maintenance was also good on the farm access roads.

Impacts

Case studies of two of the feeder roads--plus brief looks at the other two built under the project--revealed that the roads had generally helped to bring additional land into cultivation and to increase the production of cash crops, especially sugar cane, palm oil, and citrus. Where these production shifts have succeeded, farmers' income has risen three to four times over previous subsistence levels. Social services were enhanced, but less by bringing additional services in than by providing easier access to urban locations.

The distribution of benefits is complex and dependent on other factors besides roads. In one case, benefits stemmed largely from a sugar mill constructed several years after the road was completed. Increased cane production benefitted only a small proportion of farmers in the area; of that group, large farmers have benefitted most since they control much of the irrigated

cane land. Increased employment in field work and milling operations has provided additional benefits to small farmers and landless workers. But lack of support for basic grains and small-farm cash crops has left other farm families behind. Indeed, the team found signs that the lack of support for small farms may lead to a growing concentration of land ownership.

In the other case, a major agrarian reform program has promoted the production of oil palm and citrus by small farmer cooperatives. While this development has proceeded slowly and members of the cooperatives have not yet reaped many of the potential benefits, conditions are improving and there is more optimism for the future. Also, an increase in social services is evident, and commercial activity in the towns along the road has boomed.

The team found that the farm access roads had resulted in more land coming into production, higher yields from use of fertilizer and other inputs, and a shift toward cash cropping. But it was clear that the success of each access road has depended on the increased inputs and assistance that reach the cooperatives. Roads make this increased support possible--but they alone cannot guarantee such support. At least in Honduras, roads do not automatically result in higher production and income for small farmers.

Access to social services by the members of the model cooperatives was also improved. At a minimum, people can more easily get to medical and education services. Many have acquired some new amenities in their own villages: more stores with a wider range of merchandise, potable water, electricity, or better housing.

Implications of the Evaluation

Roads, by providing access to inputs, assistance, and markets, can stimulate output growth. Benefits, however, are easily skewed to large landowners in the absence of sustained and targeted programs to assist small farmers. Farm access roads, which are a component of an integrated development program designed to achieve equity as well as production objectives, are more consistent with AID's emphasis on benefitting the poor majority than are the older feeder roads.

Local participation in planning, constructing, and maintaining roads (and other rural infrastructure) help achieve development goals. Participation can better ensure that programs are tailored to the priority needs of the target groups. Interest in and capacity for this participation exists. With organizational and technical support, labor-intensive road construction, and maintenance can provide income and skills to the rural poor--and a greater sense of responsibility for their own future.

The socioeconomic consequences of roads unfold slowly--and in response to many factors. Where existing land ownership patterns and socioeconomic relationships are unaltered, benefits come slowly or favor the rich and powerful. Specific and sustained efforts to provide small farmers with access to land, inputs, credit, technical assistance, and profitable markets are necessary to ensure that the poor benefit from road projects.

ACKNOWLEDGEMENTS

USAID/Honduras cooperated with the evaluation team in every way during its three-week stay in the country. The mission provided secretarial services and met our complicated transportation needs. The doors of all staff members were open to us. The engineering office provided extensive technical support and accompanied the team on several field trips. Isaias Aguilar, our research assistant, diligently dug around in GOH ministries for base line data. Perhaps the greatest single contribution from a non-member of the team came from Luis H. Zelaya, an agricultural economist in the mission, who ensured that our work ran smoothly and more importantly helped to conduct interviews and interpret data. Back in Washington, Angela Hardeman, Frances Drwal, Carol Kling, and Patricia Cleveland typed numerous drafts of this report despite the press of their regular duties and the orneriness of the office's word processor. W. G. Brooner and G. E. Ziems of the Earth Satellite Corporation, Chevy Chase, prepared the air photo analysis that appears in Appendix C.

Glossary of Spanish Words

Ama de Casa - Housewife

Asentamiento - Small farmer settlement. Asentamientos are cooperative farms formed and assisted by INA as part of the National Agrarian Reform program.

Campesino - Peasant

INA (Instituto Nacional Agrario) - The National Agrarian Institute, which was in charge of the Agrarian Reform, colonization projects, and small farmer cooperative groups.

Manzana - 0.7 hectare

Panela - Cake of crude brown sugar

Patronato - Local community action group made up of village leaders.

Quintal - Hundred-weight

Socio - Member

Sombrero - Hat

I. PROJECT IDENTIFICATION

A. Basic Project Identification Data - Old Directions Project

1. Country: Honduras

2. Project Title: Access Roads

3. Project Number: 522-L-013

4. Project Implementation

   a. Project Authorized 9/23/65
   b. Final Obligation: 12/31/74
   c. Final Input Delivery: 1/30/75

5. Project Completion -- Final Disbursement: FY 75

6. Project Funding:

a.	AID Total	$ 5,026,000
b.	Other Donor	0
c.	Host Country	8,707,000
d.	Grand Total	$13,733,000

7. Mode of Implementation:

   a. Project Agreement between USAID/Honduras and GOH, Ministry of Agriculture
   b. AID-financed Local Contract Awards

8. Evaluations:

   a. Regular Annual Evaluations
   b. Special Evaluations (None)

9. Responsible Mission Officials during Life-of-Project

   a. Mission Directors: Newell F. William, Robert J. Mingus, Walter Stoneman, Edward Marasciulo
   b. Project Officers: Martin Dagata, Jim Bleidner, Harold Koon, Ronald Curtis

10. Host Country Exchange Rates:

    a. Name of Currency - Limpera (L)
    b. Exchange Rate at time of Project - 1L = $0.50

I. PROJECT IDENTIFICATION

B. Basic Project Identification Data - New Directions Project

1. Country: Honduras

2. Project Title: Agriculture Sector Program

3. Project Number: 522-T-025

4. Project Implementation

a. Project Authorized 6/28/74
b. Final Obligation: Term Disbursement Date 6/30/80
c. Final Input Delivery: 6/30/80

5. Project Completion -- Final Disbursement: FY 80

6. Project Funding

	Roads Portion	Total Loan
a. AID Total	$ 1,323,500	$12,000,000
b. Other Donor	0	0
c. Host Country	441,500	8,707,000
d. Grand Total	$ 1,765,000	$20,707,000

7. Mode of Implementation:

a. Project Agreement between USAID/Honduras and GOH, Ministry of Natural Resources

8. Evaluations:

a. Regular Annual Evaluations
b. Special Evaluations (None)

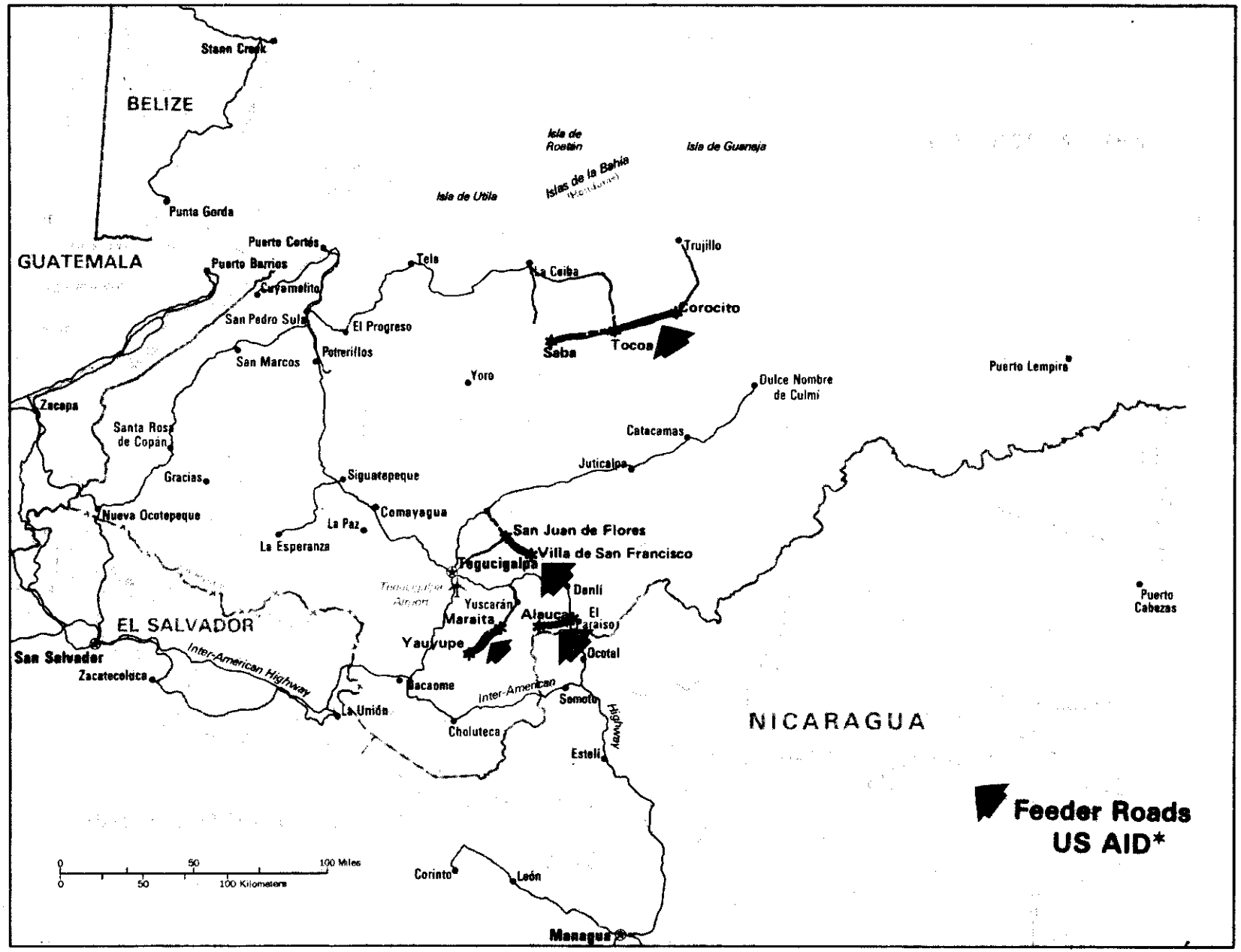
9. Responsible Mission Officials during Life-of-Project

a. Mission Directors: Edward Marasciulo, Frank Kimball, John B. Robinson, John R. Oleson
b. Project Officers: Harold Koon, James Bleidner

10. Host Country Exchange Rates:

a. Name of Currency - Limpira (L)
b. Exchange Rate at time of Project - 1L = $0.50

Honduras



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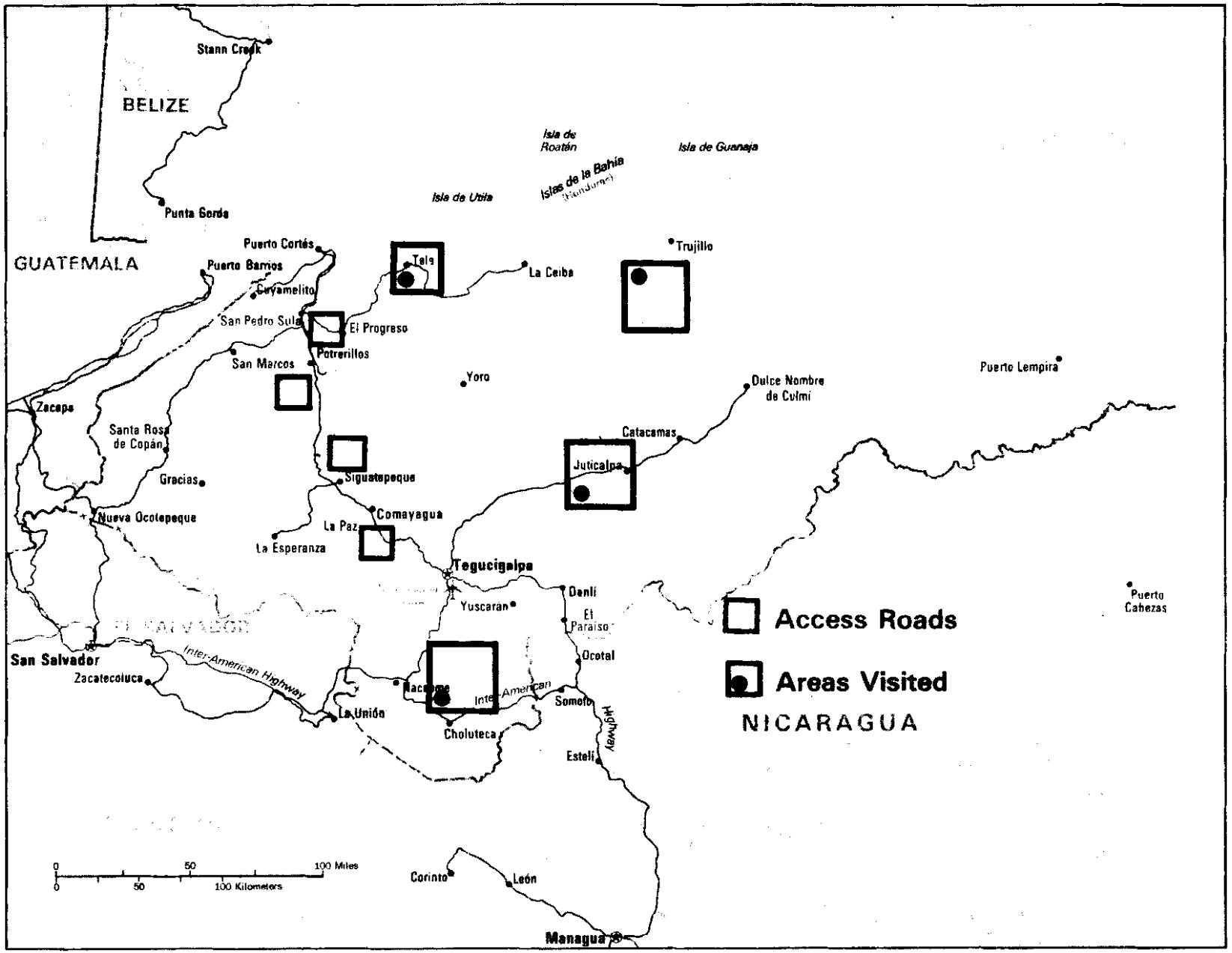
* The team visited all four sites.

Railroad
Road
Airport

Honduras



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Railroad
Road
Airport

I. INTRODUCTION

Honduras is a land poor in roads. Generally regarded as Central America's most impoverished nation, it has the region's lowest ratio of roads to both area and population. While relative figures suggest the transportation problems confronting the country, absolute numbers tell more about the consequences. According to the Honduran Government's Plan Maestro Vial, or Master Highway Plan, one-third of the country's cultivable land is not accessible by all-weather roads. About one-fourth of the campesinos live more than a kilometer from a decent road, out of range of extension and credit services, and hours from health clinics, schools, and local produce markets. On the other end of the marketing chain, residents of cities and towns frequently find themselves eating imported food, including staples such as rice and corn.

Faced with these transportation problems, the Government of Honduras (GOH) has undertaken so major a road building program during the past several decades that caps emblazoned with "CAT: Diesel Power" insignias are replacing the traditional straw sombrero. In 1960, Honduras had just 3,300 kms of highways and roads, only 110 kms of which were paved. Today, the GOH has carved out new roads in almost every part of the country, boosting the national road network to 6,500 kms. About 25 percent of these roads are paved. [1]

The Agency for International Development (AID) and an array of other international lending agencies have participated extensively in road development in Honduras, providing nearly 70 percent of total construction expenditures. In mid-June of this year, a four-man team began an evaluation to determine the social and economic consequences of rural road construction under two of AID's projects: the Farm-to-Market Access Roads loan designed in the mid-1960s and the Agricultural Sector I loan, whose completion was celebrated during the team's stay in Honduras. [2]

The two sets of roads reflect different periods in the evolution of AID's development strategy, a circumstance that sets them apart in both original purpose and ultimate impact. The mission designed the earlier project when the "trickle-down" theory of benefit flow held wide currency. This is reflected in the project paper, which assumed that the construction of all-weather feeder roads would lead to higher incomes for everyone--rich and poor--in the vicinity. By the early 1970s, though, criticism of this approach led to a reformulated foreign assistance strategy that concentrated on more

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1 As of 1978 Honduras had 2.0 kms of roads for every 1,000 people or 6.0 kms per every 100 km^2. In contrast, Guatemala had 3.9 kms per 1,000 people and 23.4 kms for each 100 km.

2 At various times the mission has used the term "access" to describe the roads built under each project. For the sake of clarity, this report refers to roads from the earlier project as "feeder roads" and those from the Agriculture Sector loan as "access roads."

directly helping poorer elements of rural populations. The concept of the second roads scheme under evaluation sprang from this "New Directions" strategy. As part of this line of thinking, road construction was just one element of an integrated rural development package supporting the Honduran agrarian reform, which was then receiving government priority.

The variations in the roads evaluated by the team were not simply between the two projects but also within them. Some roads ran through humid tropical zones with abundant rainfall; others traversed parched stretches of land overrun with scrub brush, negotiated swampy coastal lowlands subject to periodic flooding, or traced bumpy paths through highland pine forests. Crops and economic strategies also varied widely, ranging from African oil palm and grapefruit in the Lower Aguán Valley, to basic grains in Olancho and a mix of sugar cane, basic grain, and cattle raising in Choluteca. Beyond these factors, the size and organization of local farms and the government's ability and willingness to provide services differed from area to area.

From this welter of design and circumstance, the team learned that roads almost always make a positive difference--but who benefits, and just where and how far beneficiaries go varies as greatly as Honduran geography and AID development strategies.

II. OLD DIRECTIONS

A. Background

In 1965, USAID/H signed a $5.2 million farm-to-market feeder roads loan to the Government of Honduras for construction of 16 all-weather roads totalling 602 kms. According to the project paper, the GOH drew up an informal list of 23 possible roads. Then, with mission concurrence, it eliminated roads in those areas where improved transportation was least likely to bring rapid economic growth. The selected roads were located in the north central and central part of the country where isolation from markets and services kept land largely in subsistence farming or cattle ranching. The project intended to break this pattern, stimulating greater production of cash crops. Its designers projected that some 170,000 people would benefit directly and that the project would ultimately help half a million Hondurans.

Implementation of the feeder road project did not unfold as planned. First came a nine-month delay in project approval. Then no U.S. contractors responded to the bid proposals because each of the contracts was so small. By the time the mission rewrote the tenders for Central American contractors, another nine months had slipped by. Three roads were near completion by 1969, when the "soccer war" between El Salvador and Honduras broke out, resulting in diversion of GOH attention and the expulsion of a Salvadorean contractor. By 1970, prices for fuel, grease, and equipment had tripled over 1965 levels, and the mission and the GOH agreed to revise the project. Under the amendment, signed in 1971, the GOH built one more road, a 60 km stretch in the Lower Aguán Valley, joining Corocito to Sabá. The remaining funds were used to pay an engineering firm to prepare designs for nine of the remaining 12 roads.

When the project was officially completed in 1974, it offered little to praise. Total road construction added up to 113 kms, nearly 500 kms less than planned. The average cost per kilometer was $40,475, not $9,750 as originally projected. Moreover, the mission questioned the value of the completed roads. The project was supposed to tie isolated areas into the national highway system. But, in a phrase still used in the mission today, "the roads went from nowhere to nowhere."

According to the plan, each road would originate in a village on an existing road or highway, follow a route determined by economic and topographical considerations, and end at a large isolated village. In fact, however, the four roads completed under the project fed into poorly constructed, sometimes impassible roads. So, while the AID roads were high quality, they were also generally inaccessible.

The bleak appraisal of the project that was possible in 1974 has not proved to be the last word, if indeed a final judgment is yet possible. Viewed from the vantage point of 1980, some of the project's shortcomings have turned into pluses. The reluctance of U.S. contractors to make bids caused delays in construction but also stimulated the formation of local road building firms. Before this time, no such capacity had existed in Honduras. But when the opportunity presented itself, the response was rapid. "Almost overnight," recalled one long-time mission employee, Honduran entrepreneurs formed construction companies, which have been handling the bulk of the country's road construction ever since. The project also turned out to be a catalyst for subsequent feeder road construction in Honduras. With loans from the World Bank and the Inter-American Development Bank, Honduras has built 185 kms of the roads planned under the project, boosting total construction to more than half the original goal. Moreover, the GOH has constructed or improved major roads linking the four AID-financed roads to the national highway network. The access roads no longer lead "from nowhere to nowhere."

B. Maintenance

The project envisioned that the GOH would be able to maintain the newly built feeder roads. This assumption also seemed incorrect in 1974. In the end-of-project report, the mission engineer noted serious repair problems, especially land slides and erosion, along every one of the roads except the Corocito-Sabá leg in the Aguán Valley. The situation six years later, however, is far more favorable. As specified in the original project design, the gravel roads are at least 5.5 meters wide. The GOH provided adequate drainage through construction of ditches, culverts, and bridges, almost all of which were built of rock masonry or concrete. Judging from visits to all four roads, the GOH's maintenance capacity is greatly improved. All the roads were passable; two were recently graded. Drainage is excellent with few signs of erosion. The only significant maintenance problem was along the 22 km road that wends its way through the mountains dividing Maraita from Yauyupe. The GOH does some repair, but because of low traffic volume, bushes and a light cover of grass have encroached on the road, giving it the look of a single lane highway. As in 1974, the bridge at kilometer 16 remains unfinished, and only four-wheel-drive vehicles can safely ford the river and continue on to Yauyupe.

C. Impact

Of the two projects under evaluation, the feeder roads are less hospitable to broad generalizations. Indeed, the team's most fundamental conclusion is that the consequences of roads such as these are highly unpredictable. The project paper assumed that a feeder road by itself would distribute benefits to all living in the region. It involved no effort to provide credit, extension, or marketing services to those less equipped to take advantage of the new roads. As a result, the distribution of benefits varied widely depending on factors outside of the scope of the project, as the following two case studies show.

1. San Juan de Flores - Villa de San Francisco

Development along the 16.3 km road stretching between San Juan de Flores and Villa de San Francisco has come belatedly, generally favoring large landowners over campesinos. Two events, occurring five years after the road was completed in 1970, account for the delays and the particular distribution of benefits.

The first event was the Honduran Government's subsequent road building efforts, which gave the fertile valley access to national markets. Partly through force account, the GOH first improved the road linking San Juan de Flores to Talanga, which lies on the primary route from Tegucigalpa to the northeast. Later it built a good secondary road joining Villa de San Francisco to the Tegucigalpa-Danlí Highway.

The second development came with the construction of a sugar mill along the AID-financed feeder road. According to the director of one of the two sugar cooperatives recently formed in the area, some of the local farmers had thought about financing their own sugar mill in the early 1970s. When they found out that the government was planning to put a mill in the south, the farmers lobbied successfully to have the mill built along the road. The mill, operated as a corporation, was completed in 1977. The National Development Bank, a public financial institution owns the stock.

These developments have worked a profound change on land use patterns in the valley. In the early 1960s, large landowners who weren't renting their land to sharecroppers raised cattle. Small farmers grew corn and beans for their own consumption. Sugar cane, grown for home consumption or limited sale as panela, was of little importance. With the introduction of the sugar mill, cane has become the dominant crop. The year-to-year increases in commercial sugar processing illustrate the speed of this transformation. The mill, which has a capacity of 600,000 quintales annually, processed 5,000 quintales in 1977, 50,000 in 1978, 190,00 in 1979, and 357,000 this year.

The AID-financed feeder road is critical to the mill because of the importance of quick, efficient transportation to sugar processing. Farmers have only 48 hours at the most to move harvested cane to the mill for crushing; otherwise, loss of moisture in the cane drastically reduces the amount of extractable sugar. The following scenario suggests the role of the road in this process: Except for the few fields immediately adjacent to the mill, all of the cane arrives via the feeder road in trucks. During the 1980 harvest, some 22,000 truckloads of cane rolled into the mill. If the average round-trip from mill to field is 22 kms--a conservative estimate--cane transport currently accounts for some 500,000 kms of road use during the November-May harvest season alone. Looked at another way (see Appendix B), the total user savings on the road over the past decade has amounted to an annual rate of return of 12 percent on the original investment.

But while economic benefits have been substantive, they have generally accrued to the larger landowners. Land use has changed, but the structure of land ownership has not. Big farmers have remained big, small farmers small. The most consistent information that the team obtained indicated that about one-tenth of the farmers in the valley are involved in producing cane for mill. While the team could not get a complete size distribution, a mill official estimated that 70 percent of these cane growers are small. They account for roughly 40 percent of total cane production.[3] Clearly, cane production has directly benefited only a small proportion of farmers in the zone. Large farmers have received the greatest proportion of the benefits, since they control most of the cane land.

The team found several reasons why small farmers have not increased production of sugar cane. In some cases campesinos have simply been reluctant to drop old customs, including home refining of panela. More often, lack of credit, extension services, and irrigation has limited production. The two sugar cooperatives have been in the best position to capitalize on the mill. Altogether they have 85 members, few of whom are small farmers. The cooperatives account for almost 2,000 of the 2,800 hectares of land that supply the mill. They provide members with machinery and labor to help with planting and harvesting.

While sugar has received attention, no credit and technical assistance program has been directed at the production of basic grains or other small-farmer crops. Informants said that local production of basic foods has dropped. Stores now import basic grains from other parts of the country, which along with inflation would account for higher food prices.

Although small farmers living along the road are reaping relatively fewer benefits than their large neighbors, almost all can cite some advantages resulting from the road. Most often mentioned is increased access to

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3 Small farmers have 1-7 hectares of cane, medium have 7-35 hectares, and large farmers have more than 35. The team was given an estimate that the average number of hectares of cane per grower is 3.5. Census data from 1974 show 14 landowners in the region with more than 200 hectares of land.

social services, particularly medical attention. With perhaps little exaggeration, one farmer said that getting a sick relative to a doctor took "a miracle of God" before. Now regular transportation along the road makes for easier travel to Villa de San Francisco and San Juan de Flores. Small landowners are also enjoying increases in land prices. One campesino pointed out that he was making money without doing any more work because the value of his small farm had increased substantially.

Employment opportunities at the mill have also benefited campesinos. Some 90 percent of the mill's 200 full-time employees live in the area. The rest, mostly managers and professionals, commute from Tegucigalpa. During the cutting season the mill employs an additional 100 workers, most of whom come from the valley. The farmers, particularly the cooperatives, hire about 500 workers for cane-cutting and field loading during harvesting. The mill estimates that half of these workers are local and half come up from the southern coastal areas. If account is taken of all the field and mill work associated with sugar production, it appears that employment generated by the sugar mill has directly benefited 500-600 local people.

Although employment opportunities may increase, the future is uncertain for small farmers, even if they own their own land. While no observable changes in land tenure have yet come about as a consequence of the road, the team saw signs that a deterioration could occur in the future. The GOH has not carried out an agrarian reform program of any consequence in the valley. Irrigated land is limited and major capital investment is required to develop additional land. Only larger farmers currently have access to long-term credit required to bring additional land into cane production. It is possible, therefore, that these larger farmers will begin to buy out smaller farmers and incorporate their land into large-scale agribusiness.

2. Sabá-Corocito

The Sabá-Corocito road provides a striking contrast to the foregoing case. Development around both roads has come slowly, but the benefits occurring along the 60 km Sabá-Corocito road have favored small farmers, not large.

To understand how this came about requires a brief look at the history of the region. Half a century ago, the Lower Aguán was bustling with economic activity centered primarily around the United Fruit Company, which operated extensive banana plantations throughout the region. Then in the 1930s, when disease devastated the banana plants, United Fruit pulled out its operations and the area slid into economic decline. The railroad that connected Sabá to La Ceiba, the commercial hub of the region along the central north coast, discontinued service in 1942; brush overran the rich banana land, and irrigation systems and drainage ditches deteriorated. By the mid-1960s, the Lower Aguán Valley was a quiet backwater with a few large cattle ranches and numerous subsistence farms.

Despite this economic deterioration, the GOH had good reason to believe that the region could be revitalized. A report prepared in 1965 by the United-Continental Allied Co. noted "the Aguán Valley is one of the most promising agricultural areas in all of Honduras" and that the Lower Aguán

held the best prospects, "provided that communications facilities can be restored, and effective arrangements for production and marketing of crops can be made."[4]

With this encouragement, revitalization of the valley began. The AID feeder road project, signed in 1965, was designed to help solve the transportation problems. Through other means, the government would address production and marketing, which it started to do in 1969, three years before road construction started. Initially, the National Agrarian Institute (INA), which controlled most of the old United Fruit Company land along the road, encouraged small farmers to grow oil palm and grapefruit on small, individual plots. This proved only modestly successful, and the GOH restructured the scheme within a couple of years by creating production cooperatives. To date, INA has organized 86 such groups. It has recruited members from throughout the country, especially from the most populated regions such as Choluteca in the south. INA has also provided credit and technical assistance, constructed 475 kms of access roads within the cooperatives and built two plants for processing palm oil and one for grapefruit packing.

These efforts, made feasible by the road, have resulted in a major shift toward production of cash crops as the air photo analysis in Appendix C shows. In 1965, when the AID project was approved, no African palm or citrus were grown in the valley. Today farmers still raise some basic grains, but African palm covers 9,820 hectares and grapefruit 1,798. Short-term plans are to extend the total area to 11,120 hectares of palm and 2,000 of citrus.

Yet, for all the economic activity in the Aguán's agricultural sector, and INA's efforts to let campesinos share in the profits, the members of the cooperatives have not yet reaped many of the promised benefits. Perhaps the strongest evidence of disillusionment lies in statistics showing how the number of members, or socios, in each cooperative has fluctuated as some have left and others, later, have replaced them. Cooperative Salama Limitada, one of the more successful groups, illustrates this pattern. It started with 144 socios in 1970; today it has 115. Only 14 of these were members of the original group.

The team discovered that a variety of problems have bedeviled the cooperatives, driving socios away. For one thing, palm trees mature slowly. During the first five years after planting, cooperatives have had to scrape by, growing some subsistence crops and, in several cases we encountered, relying on food doles from the government. In addition, the team found evidence that INA had coupled incentives for growing citrus and palm with bad agronomic information and advice. The members of one cooperative said, for example, that in 1973 INA would give them credit only for planting grapefruit on a particular 90 manzana parcel of land. Grapefruit is sensitive to ground moisture and because the land flooded regularly, the plants failed. Similar errors have developed elsewhere.

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4 Northwestern Honduras Transportation Program, Continental-Allied Co. Inc. 1965, p. 201.

Other problems have occurred with processing and marketing. Some cooperatives began producing African palm in 1975, but the first processing plant didn't begin operation until 1977. Local grapefruit, which bruises easily and is subject to unsightly spots, has generally not met quality standards for potentially lucrative European markets. In sum, nearly every cooperative had a complaint, and about half indicated they were deep in debt. But, if fluctuation in cooperative membership is any measurement for success, it appears that the socios generally see better days ahead. Month-by-month figures for the past several years suggest that memberships have begun to stabilize. Behind this increased optimism, no doubt, is the fact that INA is building up processing capacity (it is currently building two more palm processing plants) and that more and more palm oil plants are reaching maturity. Also, cooperatives are beginning to see an increase in social services. Some cooperatives have new schools and additional teachers. Many have their own stores and buildings for crop storage. One even had a small fleet of tractors. Other groups, of course, have not done nearly as well, but in these cases the road has at least provided better access to towns along the way.

Vehicular traffic has increased annually on the road. According to traffic counts taken in 1977, the number of vehicles passing between Sabá and Tocoa daily has grown at a yearly average of 26 percent; the increase between Tocoa and Corocito has been 12 percent. Not surprisingly, the two new transportation cooperatives seem to be making financial gains. One has 6 trucks and 70 buses. It expects to build its own repair shop soon and already has a housing project. It has also invested in land in the town of Tocoa, midway on the Sabá-Corocito road.

In fact, if the countryside is just beginning to develop, the three towns along the road have boomed, as air photos indicate. Since construction of the road, Sabá's population has doubled. Local citizens say that some 70 percent of Sabá's business arrived since 1974. The town now has a health center and a nurse. The primary school has more than 700 students; the secondary school was started last year. In Tocoa, virtually every business seems to have started or expanded within the past five years. A random look at two of the town's four carpenter shops showed that one was brand new; another was in the process of moving to a bigger site. The prospects are for even greater growth. A bridge crossing the Aguán River at Sabá is under construction. It will provide a direct link to La Ceiba on the coast. As the residents of Sabá and other communities along the road put it, "the road has been good, but with the bridge it will be marvelous."

3. Summary

The two foregoing case studies--plus brief visits to the other two roads built under the project--show that the feeder roads helped to bring additional land into cultivation and to increase the production of cash crops, including sugar cane, palm oil, and citrus. Interviews indicated that where these crop shifts succeeded, producers could earn net incomes three to four times higher than their previous subsistence level incomes.

The two case studies also indicate that agricultural changes vary depending on the kind of input supplies and technical assistance that follow the roads. In the case of the San Juan de Flores-Villa de San Francisco road, the mill provided the stimulus for sugar growing, which mostly benefitted large farmers. By contrast, INA provided services to small farmers in the Lower Aguán. A third case, the Maraita-Yauyupe road also built under the project, illustrates what happens when no outside interest buttresses the roads. Judging from the meager data available and a few interviews, it was clear that economic activity has not grown appreciably in the area. Traffic counts, for instance, show virtually no increase since 1974 when the average daily number of vehicles on the road was seven. The project paper had predicted that timber production and the cultivation of some cash crops would increase, but neither the private nor public sector has provided incentives for forestry or farming. For the same reason, new non-farm activity in the region appeared almost nonexistent. In contrast, major regional development efforts spurred non-farm business activity in Sabá, Tocao, San Juan de Flores, and Villa de San Francisco.

Although the project did not aim to improve services for people, all four roads did. The team found little evidence that roads brought services in but informants noted that it was easier to reach hospitals and schools. Even on the Maraita-Yauyupe road, which has seen the least amount of economic progress, residents noted that a bus service operated daily, allowing them to get into nearby towns more frequently than before.

III. NEW DIRECTIONS

A. Background

In 1973, while the Congress charted a new course for U.S. foreign assistance, the Honduras mission designed its first integrated agricultural sector loan project. Approved in early 1974, the $12 million loan--with a small grant component--reflected the freshly minted New Directions legislation that AID was charged with implementing. "The overall goal of the sector program," said the project paper, "is to improve the well being of the rural poor of Honduras." More specifically, the project was designed to support the agrarian reform. Under the reform, the GOH was helping small farmers organize into production cooperatives. The AID project would assist a selected number of these cooperatives--commonly called asentamientos or farm settlements--increase production of cash crops by providing each with credit, agricultural education, technical assistance, and a road joining their fields to a nearby feeder road. The roads were needed, the project paper stated, "to facilitate technical assistance, farm inputs, marketing, and GOH management of the program generally." In addition to the asentamiento effort, the project aimed to increase the national government's overall ability to help small farmers.

According to the original plan, the GOH was to select, with mission approval, "model" cooperatives on the basis of established criteria. These stipulated that cooperative land be able to support cash crops, that the cooperative have legal standing, that the farms average at least 3 hectares

per family, and that cooperative fields lie no further than 5 kms from an existing all-weather road. The mission and the GOH did not consider the construction costs of the individual roads.

The mission initially planned to experiment with two road construction techniques during the first phase of the project The first alternative called for the GOH to design the roads and for private contractors to build them; INA and CARE/Honduras, under contract, would promote community awareness and establish a community organization for minor and emergency maintenance. The second planned approach was intensive. The GOH was to design the roads; a group such as CARE/Honduras would educate citizens in the value of the road program, purchase materials, contract local laborers, and establish a community organization for construction and maintenance. A private consultant would supervise construction.

As with the feeder road project, delays in implementation precipitated major modifications in the road building plan. The GOH took nearly 18 months to issue the agrarian reform regulations needed to give legal standing to the cooperatives. Later the Ministry of Natural Resources, the Agrarian Reform Institute, and the National Development Bank did not quickly agree on which legal settlements to designate as "models" under the project. By 1977, three years after the project was signed, the mission and the GOH decided to make up for lost time by abandoning the road construction experiment and using the capital intensive approach. Construction was further streamlined with elimination of the plans to create community awareness about the road and to develop a local maintenance capability. Anxiety about delays also led to modifications of some of the criteria for selection of model settlements, including the requirement that cooperative fields be within five kilometers of an all-weather road.

By the end of 1978, the GOH had built all the planned roads. This amounted to 53 access roads totalling 304 kms and reaching 61 model settlements. The costs of road construction differed widely from one place to another, depending on local soil conditions and drainage, and whether some kind of thoroughfare existed before. At the low end of the scale, construction figures were $1,698 per kilometer. At the high end, they were $25,745 per kilometer. The overall cost of road construction was $1,765,951 with an average per kilometer cost of $6,608.

The zones of influence of the roads varied as much as construction costs. In some instances, roads penetrated less than a kilometer into a field that already abutted a major highway. At the other extreme, roads as long as 10 kms served more than one model cooperative and passed by non-model groups or through villages. The one thing the roads all had in common was that they primarily served small farmer cooperatives. With only a very few exceptions did the roads even pass by large farms enroute to their targets.

B. Impact

1. Agriculture

The primary purpose of the access roads built under this project was to encourage greater production of cash crops. Through interviewing members of

some 15 model cooperatives, the team found that most groups had become increasingly market-oriented after construction of the road, with corn, sugar, and cotton the most common crops. When possible, cooperatives also brought more land into production. One dramatic example of this was seen near Choluteca at the La Nueva cooperative. Before the 3.8 km road arrived, the land was used almost exclusively for raising livestock. Last year the cooperative cultivated 108 manzanas of sugar cane, 30 of corn, and 80 of cotton.

The access roads have facilitated shifts toward cash cropping by making it easier to get produce to market. Previously, many of the cooperatives had to cart their harvests to towns or nearby highways for pickup. This was costly in time and energy, and hence limited cash crop production. But today, trucks can drive right up to the cooperative fields, and the farmers claim that the number of buyers has increased significantly. Members of one cooperative, for instance, noted that trucks even come in from other departments (states) to buy its produce. With the resulting competition, the cooperative has been able to sell its produce directly at the farmgate for the same price it would get in town. One socio joked that there are so many buyers during harvest season that stop lights should be installed along the road.

Thanks to the road, credit, inputs, and extension services are more accessible. In fact, roads are often a de facto condition for credit. Repeatedly, farmers noted that they could get credit for land near the road but not for other fields. They also said that extension workers would visit those areas they could reach by vehicle but were loathe to tramp through fields to reach out-of-the-way plots. Non-model groups fortunate enough to live along the path of the new roads have also seen an increase in services even though the project did not aim to help them. Farms in one of these cooperatives said that GOH extension agents are currently experimenting with 16 varieties of corn on their land.

The smallest changes occurred when the access roads penetrated into a cooperative field already on an all-weather road. In these cases, the roads were a convenience but not essential for bringing about changes in agricultural production. The access roads allow trucks to drive deeper into a field, but the amount of work previously needed to haul produce five hundred yards or so to an existing road had not been significant enough to keep the cooperative from producing cash crops. Moreover, many of those asentamientos along existing roads had credit even before the AID project.

As the above suggests, the success of the access roads depends largely on the increased services and advice that can reach the cooperatives. It is also clear that while roads are necessary for credit and other services to reach farmers, they cannot by themselves ensure that such assistance will arrive. This is the reason for using an integrated approach to development--and it is the reason that the access roads in the agriculture loan are not an unqualified success.

In roughly one-fourth of the model cooperatives visited by the team, socios bitterly complained about availability of credit and the quality of the technical assistance and advice delivered since the roads came in. At La Sureña, a cooperative in the Aguán Valley, for example, socios said that credit was made available too late last year, and they hadn't taken it. They also indicated that the amount of technical assistance had decreased in the past few years. A similar situation was found near Choluteca with the El Pillado cooperative. Since the road was completed, the cooperative has received no credit and no fertilizer. The yields for corn, planted collectively, are 12 quintales/hectare, whereas farmers in the region often report harvests of 40-50 quintales per hectare.

The quality of the farm land is another factor that has limited the benefits of the road. One criteria for selection of "model" cooperatives was that they have good agricultural potential. Some, however, did not. Cedros and Venecia, located on the north coast near Tela, had production problems, including flooding and drought, dating back before the road was built. Both have reduced agricultural production since the road arrived and switched to raising cattle. Because cattle can walk out to the highway, the access road is of little importance to these farms. Other groups have continued to farm their land despite problems with water control. The cooperative 19 de Julio near Choluteca related that floods come frequently and just a few weeks earlier had wiped out 32 manzanas of corn.

On balance, however, the cooperatives reported increased yields on crops for which more fertilizer was available. Corn, the country's basic food, was the clearest case. The team found several cooperatives where yields have doubled. The most successful group seen by the team plants twice as much corn as previously and obtains 50 percent higher yields. These two changes have led to a three-fold increase in corn production.

The team prepared farm budgets on seven of the access roads. The annual rates of return in five of these were positive, ranging from 8 to 35 percent. The two cooperatives having negative returns were plagued by bad technical advice and have acquired large debts.

2. Social Services

Although the goal of this project was to boost farm production, the roads have influenced the social side of cooperative life too. In almost every case where AID-financed roads have provided greater access to the national highway system, the socios see at least some improvement in the quality of their lives, even if the production of cash crops has moved ahead haltingly. At a minimum, members of cooperatives can get out to services. But in many instances cooperatives are able to attract new services, especially if their villages as well as their fields are located along access roads.

Although it was not possible to make meaningful traffic counts, the team found evidence that commercial transportation has increased. As might be expected, the increases in traffic were higher when the roads ran past a number of cooperatives, rather than just one or two. In some cases,

cooperatives have purchased their own transport. Typically, such groups bought a small pick-up truck, but in one case individual socios had increased their mobility. In San Isidro, near Juticulpa, no one owned a bicycle before the road came. Now seven of the 35 members have bicycles and this pattern is being repeated along the new road.

Better transportation has directly enhanced educational opportunities. Before the road was completed under the AID project, one small bus made irregular trips to El Potrero de las Casas, where the members of the San Isidro cooperative live with other farmers. Today buses pass by the village four times daily, making it possible for 12 students to attend secondary school in Juticapla, about 20 kms away. Conversely, two teachers in the village primary school commute from Juticapla daily. Elsewhere cooperatives have built or improved their schools. In Cedros, where agricultural production has largely failed, the team saw socios building a three-room primary school. Education benefits are also extending beyond children. In 20 percent of the cooperatives visited, the team learned that adult education classes had begun since construction of the road.

Although not every cooperative benefited to the same degree, most with no easy access to an all-weather road before have acquired some new amenities: better housing, more stores with a wider range of merchandise, electricity or potable water. Almost all of these cooperatives had improved access to medical services. One striking example is the village of La Concepción, which is populated by members of a model cooperative as well as a number of other farmers. The community had a health center several years ago, but it had no staff. Now the center is not needed. The constant flow of buses and trucks makes it easy to reach Juticalpa, about 30 minutes away, where services are considered superior to anything that a health center in La Concepción can provide.

3. The Effects of Local Participation on Maintenance and Construction

It is sometimes said in Honduras that road maintenance is only possible if the GOH does it. The team found evidence disputing this. To be sure, the highway department has done a good job of repairing the longer access roads without any prodding from the AID mission. With only a few exceptions, drainage was good and bridges repaired. But the GOH does not maintain the shorter access roads that go directly into cooperative fields. In these cases, where maintenance has become the responsibility of the cooperative, the team observed that the socios will do repairs, even when the required work is prodigious. Socios in cooperative Jílamo, located between Tela and La Ceiba, spend a total of four weeks a year clearing the 2.8 kilometer road of grass and weeds, which in a four-month period can grow ten feet tall. Like other cooperatives, Jílamo needs an entry road to another plot of land. The members say that they would do the work if the GOH would help them build a small bridge and install culverts.

Other examples encountered by the team also suggested that the involvement of farmers in road construction provides benefits beyond the road itself. The two following situations illustrate the value of giving beneficiaries a role in road building.

--Agua Caliente, on the north coast, was supposed to receive a 4 km road. The GOH completed only 3 kms. Mission engineers say that this shortfall occurred because of the high cost of building the road through the cooperative's boggy low land. Conversations with the socios revealed that none understand this nor do they know that AID is planning to complete the road under another project that is just now getting underway. As a result, many of socios feel cheated and powerless.

--The psychological uplift that comes with building a road is difficult to measure. But the team saw one instance of the enthusiasm that results when people think they had a hand in just acquiring a road. A year before AID financed the road through La Concepción, a local patronato approached the mayor of Juticalpa and the governor of Olancho asking for a road. Whether or not the pressure applied by the patronato had any effect on the GOH's decision to recommend a road through La Concepción is a question the team could not answer. In any event, the leaders of the patronato are convinced that their initiatives were responsible for construction of the road. This has given the leaders an obvious sense of confidence that influences the way they pursue other improvement schemes.

IV. CONCLUSIONS AND LESSONS LEARNED

The two foregoing rural roads projects span not only a decade of time but a sea change in thinking about development as well. The GOH and AID have progressively refined their rural roads strategy since the feeder road project left the drawing boards. A more comprehensive view of the interrelated nature of physical infrastructure, and agricultural and regional development has evolved. Roads are now more often viewed as one component of regional development projects designed to ensure equity and efficiency. USAID/Honduras has shown increasing concern with the importance of local access roads that reach small farmers and campesino groups, and with the role of more labor-intensive road construction. It is the team's belief that this evaluation both confirms these New Directions approaches and highlights some of the pitfalls that can hamper complete success.

1. Roads are required for development but by themselves are seldom a sufficient condition.

The roads built under both projects were to generate economic growth, particularly greater production of crops for sale. But while both types of roads can lead to more production of cash crops, the degree of change along the roads varied dramatically depending on a wide range of other factors: soil quality, climate, flooding and drainage, credit, markets, and extension services. In some cases one or more of these other factors constrained output increases after the road was completed, especially where small farmers were involved. This finding is consistent with the view that roads, by providing access to inputs, services, and markets and by making input/output price relationships more advantageous, can stimulate production.

2. The distribution of the socio-economic benefits of roads depends greatly on corollary policies.

The evaluation shows that a coordinated set of public policies and programs is needed if small farmers are to participate in the growth process. Only when the GOH provided small farmers with access to information, inputs, credit, and technical assistance, and only when profitable markets existed were benefits distributed to the lower income strata. When the impetus for development is left to forces already at work in the area, benefits are easily skewed in favor of the larger landowner (San Juan de Flores-Villa de San Francisco) or progress is painfully slow (Maraita-Yauyupe).

3. Access roads are more consistent with the New Directions philosophy than are feeder roads.

In contrast to the Old Directions feeder road project, the benefits stemming from the access roads went almost exclusively to those farmers at the bottom of the economic ladder. This was because the feeder roads, which spanned relatively long distances, were not able to discriminate between larger and smaller farmers. The access roads zeroed in on enclaves of poor farmers, rarely traveling past larger farms.

4. It is difficult to make a "final" appraisal on road projects.

The consequences of the feeder road project unfolded slowly, suggesting the hazards of condemning or praising projects too soon. Indeed, no final assessment of the feeder road project may be possible even now. Ten years ago the Villa de San Francisco-San Juan de Flores road was considered a failure. Today it has opened a new, profitable market for local farmers. The forces at work could, however, conceivably result in greater disparities in incomes or perhaps in the development of large agribusinesses eliminating small farmers altogether. Looked at in this way, the most important consequences of the more recent agriculture sector loan's access roads may not reveal themselves for some time to come.

5. Projects should be flexible enough to meet local needs and conditions.

The evaluation calls into question the utility of rigidly structured development schemes such as undertaken in the agricultural sector loan. The project design assumed that every model cooperative needed a road. The team learned, however, that groups often did not need or want roads as much as, for example, irrigation canals or drainage ditches. Although difficult to accomplish with small staffs, it would have been more profitable to tailor the project to the needs of the small farmers who were to benefit. By doing so, land that needed better water control would now be more fully productive.

In the same way, the narrow criteria for selecting model cooperatives limited the potential impact of the roads. Under the project, the selection criteria did not include the cost of road construction to cooperative fields. Neither did it take into account a road's zone of influence: some roads merely extended into a field along a major highway; others passed by a number of non-model cooperatives as well as through communities. As a result, road

costs differed by a factor of almost 15 and the zones of influence varied as dramatically. If the selection criteria had included the construction costs of the roads and their zones of influence, the number of roads and the number of beneficiaries would have increased with the same expenditures.

6. Beneficiaries should be involved in project design and implementation.

Neither the access roads nor the feeder roads involved beneficiaries in their construction. Our field interviews and observations suggest that the motivation for road building and maintenance exists in many local communities. Perhaps the most dramatic example was along the Maraita-Yauyupe feeder road where a man had single-handedly hacked out a one kilometer access road so he could more easily sell timber. As a result, the team agrees with USAID/ Honduras's subsequent efforts to introduce more labor intensive activity into road construction projects in areas with underemployment. The positive benefits of using local labor warrant continued efforts to overcome the administrative and managerial problems that have hampered such approaches in Honduras. With good, sustained supervision and intermediate technological support, local road building can provide small farmers not only with new skills but also with a pride of authorship in their own futures.

APPENDIX A

EVALUATION METHODOLOGY

EVALUATION METHODOLOGY

The evaluation team consisted of four members: a transportation economist from the Asia Bureau, an anthropologist from the Latin American Bureau, a development economist (contracted), and the team leader (Special Assistant, AA/ASIA). The team was assisted throughout its field work by a direct-hire economist from USAID/Honduras. In addition, a local law student was contracted as a research assistant for the team.

The team participated as a unit in a workshop held in AID/W prior to the evaluation. This workshop, conducted by PPC/E, was useful to explain the objectives of the evaluation and the expectations of the Administrator. The procedures suggested by the evaluation staff as well as the review of the experiences of previous evaluation teams provided helpful guidelines. As experience accumulates, these workshops could deal more specifically with the questions each evaluation team is expected to answer and the alternative methods that other teams have used in answering these questions.

The team worked out a general approach for the evaluation during the
 r and communicated it to the mission by cable. Since the
ole for two quite different roads projects, it tentatively
decided to concentrate field work in just three or four locations. This approach was selected to give more depth to the evaluation and because we expected that the two types of roads were physically linked in some locations.

The team also contacted other donor agencies and attempted to assemble and review pertinent literature prior to departure. This background work is difficult to do thoroughly and systematically when team members are busy with their normal activities.

The team spent three weeks in Honduras. Members used the first two days to review the evaluation with mission and government personnel, select sites to be visited and make logistical arrangements, and review project files, secondary data, and reports relevant to the evaluation.

The team soon began to question the advisability of limiting its visits to just a few sites. After several days in the field, it was clear that a large part of the story of these roads lay in the great differences among them. In light of this, generalizations about a handful of the roads were unlikely to apply to all of them, and the team decided to sample a larger number in hopes of fitting together a more nearly accurate picture of the consequences of the projects. Members of the team visited all four of the feeder roads and traveled to the three major concentrations of access roads projects plus to one smaller area. Within these concentrations the team saw as many roads as time permitted, selecting them more or less at random. Altogether the team looked at 15 access roads.

Team mobility was critical during the ten days devoted to site visits. The Mission provided two 4-wheel drive vehicles and drivers, as well as other logistical and secretarial services. This assistance was crucial given the team's need to move quickly between and within sites.

Team members structured interview questions around the following major topics:

1.) Land utilization
2.) Crop composition
3.) Production technology
4.) Land tenure
5.) Handicraft, small-scale industry and commercial activities
6.) Agricultural inputs and services
7.) Consumption
8.) Marketing and subsistence patterns
9.) Road traffic and transportation costs
10.) Local organizations
11.) Social services
12.) Levels of living and aspirations
13.) Environmental effects

The team interviewed farmers, local leaders and government workers at each site. It was not feasible for each team member to interview all the relevant persons at each site. Therefore, the team frequently split into two groups and each member became responsible for covering a broader set of questions.

The team members spent the last three days in Tegucigalpa assembling data following assignments worked out by the team leader. The integration of the preliminary materials into an overall report was the responsibility of the team leader after his return to Washington.

Lessons Learned

1. For most conclusions, especially of projects where roads are built in widely dispersed areas, existing secondary socioeconomic data are of little value. Most secondary data series are not sufficiently disaggregated geographically. Census information can sometimes be used for "before and after" comparisons but finding censuses available for the right years is unusual, to say the least.

2. The difference between three or four weeks in the field does not really determine the depth of the evaluation nor the degree of quantification of the results. Only a 5-6 month effort utilizing a large field survey staff and computerized data processing would permit valid quantitative measurement of the principal socioeconomic impacts.

3. Evaluations are enhanced by good base line data. To judge by our experience, the evaluation procedures included in most AID projects are not being carried out in practice. Thus, the real gains in knowledge are more likely to come from strengthening the internal project evaluation process rather than conducting ad hoc evaluations.

4. Although some roads under the feeder road project were completed 10 years ago, they are still "young." Impacts of the roads are revealed gradually over time and conditioned by an array of variables impossible to predict fully. This suggests that periodic re-evaluation of a few projects would be useful to determine long-term impacts.

5. Even with the best of intentions, the team gathered little information from or about women. A female member would have strengthened the team's efforts to identify impacts on women.

6. To supplement "before and after" impacts evaluations, use of control sites for "with and without" comparisons is appealing. However, the team found it impossible to use the latter approach in the case of feeder roads, and difficult to identify good control groups in the case of the model group access roads.

APPENDIX B

TECHNICAL ANALYSIS OF ROADS

Technical Analysis

Feeder Roads:

The Old Direction roads were designed as 5.5 meter roadways with horizontal and verticle curvatures accommodating a relatively slow design speed and low-volume traffic. Construction of the four Old Direction roads was completed under Honduran contracting specifications and with newly formed local contractors. Construction costs averaged $40,475 per kilometer. Cross-drainage was accomplished by corregated cross-culverts and river fords.

The Old Direction roads stand out as good examples of Honduran engineering resourcefulness. One example is the use of abundant renewable resources such as wood to construct low-cost timber bridges. Low volume traffic bridges of this nature more than sufficed over the more expensive steel or concrete bridges. Likewise, the GOH's use of the abandoned railroad bed and its ballast to construct a portion of the Tocoa-Saba road in the Aguan Valley was resourceful.

These four feeder roads stand as good models for routine maintenance.

outine maintenance from several small district centers
he country. Most maintenance is supported on a force
cording to IBRD reports, the GOH has indicated that a minimum of 70 million limperas has been invested in highway construction over the 1977-80 period. The bulk of funds, however, went to intra-regional roads with 6.5 million limperas earmarked for equipment renewal. This points out two important factors: (1) that the GOH has accorded increased importance to maintenance and (2) the international lenders are helping to pick up the slack by setting aside portions of their road construction loans for maintenance. Recent grant assist for road maintenance is also being channelled into rural maintenance yards for specialized equipment adaptable to low-volume road maintenance. Although past efforts to utilize labor intensive efforts have been disappointing, especially in road construction, village-level maintenance brigades hold a more promising future.

Methodology

Road user savings analysis remains one of the basic tools for analyzing benefits for proposed upgrading of roads. Applying this approach ex post facto to a competitive industry such as Honduran trucking offers a way of evaluating vehicle savings from upgrading a poor aligned dirt road to an all-weather realigned gravel road. The evaluation team used this technique for the one case where adequate data existed, the Villa de San Francisco-San Juan de Flores road. From that data, net transport savings were derived and recorded to determine what percentage of the savings were passed on to the local producers within the zones of road influence.

For the Villa de San Francisco-San Juan de Flores road, traffic counts from 1971 and 1978 were available. These counts and user savings associated with buses, trucks, and light-trucks were expressed in 1978 prices. This tended to wash-out inflationary factors, of both costs as well as savings. Broadly applied, the net user savings were extended beyond the 1978 period for two years at the measured rate of increase. The project life, for the

purpose of the impact economic evaluation, was established at 10 years (see Table II). After inserting recorded maintenance costs, construction costs, and the 1980 residual value of the road, the total value of the net benefit stream was derived to provide a net benefit per kilometer.

The rate of return, when based upon linear rates of change in traffic and combined with constant costs and user savings, reflects the savings of vehicles travelling at an average speed of 24 km per hour over the original dirt roads, and 40 km per hour over the finished all-weather roads. These savings were derived from average operational costs such as tire wear and fuel, and depreciation. Although vehicle savings for buses were included, this analysis takes an extremely conservative approach by not accounting for passenger savings in reduced bus transit time. It also ignores auto passenger savings. Based on these factors the rate of return is 12 percent.

Interviews with several trucker-cooperatives and many farmers indicated that user savings have been passed downward. Several truckers said that they have absorbed increased costs, especially 1973-76 petroleum price increases. Farmers and farm co-op members confirmed that very little change in transport costs have occurred since the roads had been constructed. This suggests increased competition among truckers and a more competitive atmosphere after the roads are placed.

Access Roads

A close analogy to the cooperative (asientamiento) access roads would be an extended driveway from a main feeder road to a settlement area. These all-weather roads provide cooperatives with access to marketing centers and agricultural services. They also provide two-way access to social services such as health, education, and other community development services.

From an engineering point of view, all the roads were not built to the same standards. This resulted, in many instances, because of the differences in terrain. For example, it was sometimes necessary to elevate the roadway out of the marshy plains, as in the northern areas around San Pedro Sula, whereas in other cases the existing base was adequate. Usually the roads were aligned by field engineering and built up by material saved from the side ditches. This formed the subgrade and was overlaid with imported select granular material.

According to the standards proposed in the project paper, most of the asientamiento roads were designed to attain a 30 meter right-of-way with four meter roadway and 0.70 meter shoulders. Most importantly, ditching was stressed as well as a three percent (3%) crown on the roadway. Contractors generally supplied the minimum amount of equipment, often using dump trucks to haul in select material after a small bulldozer and motor grader shaped the roadway. Compaction, it was reported, was provided by the loaded trucks or the bulldozer. This technique is often used for labor intensive road building and was probably acceptable in this case, given the type of roads under construction.

While variance in the road geometrics and materials ranged widely, the select material of the surfaces generally appeared to be well compacted and

the roads were reasonably drained. To increase the standard of these roads would far surpass the need or economical justification. The costs varied, but generally spanned from $4033.00/km (in the Choluteca area) to $14,773.00/km (in the Aguan Valley).

Methodology

The methodology to evaluate the New Direction roads was developed around a brief questionnaire measuring the farm income, consumption and general financial status of the settlements before and after access was provided. The farm budget questionnaire also drew out many historical issues pertinent to the development and selection of the project. The measure of "producer surplus" used for the impact was the net cooperative income reported both before and after the road was constructed. The budget output illustrates the settlement as a whole, thereby smoothing out any bias of high or low achievers within the work group. The multi-year change was ultimately summed up by using a discounting method yielding rates of return.

The production variables used to examine the "farm budget" were (1) land use - to identify the change of cropping patterns over a 3-4 year time frame and determine why change occurred; (2) recorded yields - compared to annual change based upon fertilizer inputs, improved seed, and increased agri-extension; (3) on-farm losses - due to poor storage during period of limited access to markets or losses to rodents and other pests; (4) home family consumption; and (5) the net production value--derived arithmatically to produce the annual gross sales at the farmgate. On the expenditure side of the equation, credit and the cost of securing credit was obtained as well as financial costs for fertilizer, pesticides, improved seeds, animal traction, land preparation, fencing, family and hired labor, housing costs and debt servicing,--all to determine:

1) Annual income of the cooperative;
2) the net return to labor and management; and
3) after deducting pre-project income, the net financial rate of return to the road project investment.

Before the roads were constructed, very few inputs or agri-related government services were entering these areas. Therefore, most increased inputs, such as fertilizer, etc., were not subjected to rigorous net costing. It was also determined that since the programs were relatively new, price differentials would be negligible.

Reported change of cooperative income or farm activity was recorded and then extended to year ten, with constant farm activity from the present onward. Net change after road placement was weighed against the costs of road construction. The discounted methodology was used to develop the project rate of return.

From the seven cases, five of the returns were positive, ranging from 8 percent to 35 percent. However, two cooperatives fell into negative impact category--one suffered a tremendous $9,000 loss due to poor agriculture advice (with regard to plantains), and another became so heavily indebted that most of the original members had gone back to the city looking for work.

TABLE I

TRAFFIC VOLUME FOR
VILLA DE SAN FRANCISCO - SAN JUAN DE FLORES

(Excludes Passenger Cars)

Traffic	ADT* 1971	ADT** 1978	Average Increase Per Year	Change in Net Daily Traffic 1971-1978	Savings*** from dirt to gravel
Light trucks (Pickups)	20	103	11.867	83	$0.047
Buses	11	27	2.29	16	0.16
Trucks	14	60	6.57	46	0.242
TOTAL	45	97			

* Volumenes de Transito en Las
Carreteras de Honduras
Brown and Root, S.A. 1971

** Plan Maestro Vial de Honduras
TAMS - Dec. 1977-78

*** Savings from rough dirt road to gravel surface
with speeds of 24 km/hr - 40/hr respectively.

TABLE II

USER SAVINGS ANALYSIS FOR
VILLA DE SAN FRANCISCO - SAN JUAN DE FLORES
(Rate of Return = 12%)

Project Costs ($)		Increased Traffic * (Vehicles)			($)			Total ($)		
Capital	Maintenance Per Km	Lt. Trucks	Buses	Trucks	Savings per Year			Annual Savings Per Km.	X Km.	Total Net ($) Benefit Stream (per km)
1970 - 408,491		-0-	-0-	-0-	-0-	-0-	-0-		-	25,521
1971	200	11.9	2.3	6.6	197	130	564	891	16	691
1972	"	23.7	4.6	13.1	393	260	1,119	1,772	16	1,572
1973	"	35.6	6.9	19.7	591	390	1,683	2,664	"	2,464
1974	"	47.4	9.2	26.3	786	521	2,246	3,553	"	3,353
1975	"	59.3	11.5	32.9	984	651	2,810	4,445	"	4,245
1976	"	71.1	13.7	39.4	1,180	775	3,365	5,320	"	5,120
1977	"	83.0	16.0	46.0	1,377	905	3,929	6,211	"	6,011
1978	"	94.8	18.3	52.5	1,573	1,035	4,485	7,093	"	7,613
1979	"	106.7	20.6	59.1	1,770	1,166	5,048	7,984	"	7,784
1980 (residual value) 4/5	+326,793	118.6	22.9	65.7	1,966	1,296	5,612	8,874	"	20,225

*Excludes Passenger Cars

.047 X 353 = 16.59
. 16 X 353 = 56.48
.242 X 353 = 85.42

Construction Aspects

Road	(M) Width	Shoulders	Construction/ Type terrain	Length	Design speed	Projected Vehicles per day	Drainage facilities	Surface type	Maintenance type	Remarks
Maraita - Yauyupe	5.5 m	+- 1 m to ditch	All wx side hill cut in rocky-hilly terrain	23 kms	50	6-7	fair, but major forde at km 16 was washed out during 1973 flood	Surfaced with crushed stone part of roadway supports light grass - Basically good alignment -	Bladed twice yearly Some errosion observed - this might be prevented by seeding raw cuts - good maintenance	In order to approach road you have to drive over the link road from CA-6 to Maraita. This road is epitomized by extremely poor maintenance severe rutting due to lack of maintenance, and poor surface material. Design standard obviously lower than AID road. Definetly a severe constraint to Maraita.
El Paraíso - Alonca	5.5 m	0.7 to ditch	All wx rolling hills	17.4	50+		Excellent forde construction lateral drainage very good	Crushed surface material overlain with sea gravel. Excellent surface	Ditches appeared clean, was recently maintained Very well maintained	By far the best of the 013 roads. Connects directly to an asphalt surfaced road.

Construction Aspects

Road	(M) Width	(M) Shoulders	Construction type terrain	Length	Design Speed	Projected Vehicles per day	Drainage facilities	Surface type and rideability	Maintenance type	Remarks/General Comments
San Juan - Vl. San Fco.	7.3	2	All wx rolling hills	16.31	60	278	good drains concrete borders reduce errosion	Surfaced with crushed stone needs resurface in some parts rideability	Road has received maintenance on regular basis - Culvert was reconstructed during 1974 Maintenance appeared to be very good	The road leading east out of S.F. was constructed by Caminos via Force Acct. during 1973. Construction followed the same design as the AID road with a major bridge across the Yeguare river. A second "induced road" was constructed by Caminos linking S.F. with Talanga. This allowed by-pass around Tegucigalpa
Corocito - Tocoa - Sabá	5.3	2	All wx flat-tropical mainly fill type x-section with many bridges	58	100	Tocoa-Sabá 120 Tocoa-Corocito 261	Concrete bridges & cast culverts headwalls in good condition	Gravel - however some repairs appear to be accomplished with river run	Maintenance amounts to reshaping - Maintenance was excellent	This road opened up the Corocito-Tocoa-Sabá-Aguán segment and provided the catalyst for an additional 130 kms of penetration roads toward the valley extremes. Standards for those roads are poor and reflect very little engineering. Most are merely blazed into the area. Some upgrading has occurred.

APPENDIX C

AIR PHOTO ANALYSIS OF LAND USE CHANGE IN THE AGUÁN VALLEY

During its stay in Honduras, the evaluation team, with the help of the mission, acquired air photos taken of the Lower Aguán Valley in 1954 and 1980. Upon returning to Washington, the team contracted with the Earth Satellite Corporation to prepare a photo analysis of the development of two selected areas in the region. The following analysis is adapted from the Earth Satellite Corporation's report.

INTRODUCTION

The Aguán River flows through a broad, fertile valley in northern Honduras. The aerial photographs dating from 1954 indicate the relatively sparse settlement and subsistent economy of the region. The community of Tocoa contained fewer than 120 households. The region was serviced by a small airport outside Tocoa. An abandoned railroad ran the length of the valley.

Fluvial processes are dynamic in the Aguán River, whose course changes with regular floods. Settlement near the river has shifted with the river morphology. To the southeast, mountains rise abruptly to more than 900 meters above the flood plain, restricting development and settlement to the valley bounded by the steep slopes.

rough USAID's feeder road project, the GOH constructed a highway over the abandoned railroad bed connecting Sabá, Tocoa, and Corocito. This new communication link, as well as other regional rural development projects, has resulted in a dramatic change in the character of the Aguán Valley landscape and the quality of life to its increasing inhabitants. These changes are well illustrated and documented on aerial photographs acquired in 1980.

To illustrate in further detail the character and quantity of landscape changes in the Aguán Valley, two areas were defined and analyzed on 1954 and 1980 aerial photographs. Plate 1 shows the area of Tocoa (lat. N. 15 39', long. W. 86) in 1954 and 1980; each photo covers approximately 3100 hectares at 1:45,000 scale. Plate 2 shows the area of Zamora (lat. N. 15 37', long. W. 86 15') for 1954 and 1980. Each photo also covers approximately 3100 hectares at 1:45,000 scale. Tocoa and Zamora, approximately 8 km apart, are linked by the AID Loan project road. Major land use/land cover categories, as interpreted from the aerial photographs for each area and year, are summarized on Table 1.

Discussion

A. Tocoa

The Tocoa photos (Plate 1) show a 5.58 km segment of new road (1980) and the surrounding landscape. In 1954 the area was largely forest (32%), brush (11%), and pasture (43%) lands. Forests are seen in the mountains (A), on extensive areas of the valley plain between the mountains and the abandoned railroad bed (B), and along the Tocoa River (C), a tributary of the Aguán River which bisects the photos.

The town of Tocoa (D) had an estimated 1954 population of 650-700 persons (calculated on the basis of 6 people per household). An airport parallels the abandoned railroad bed with a runway of approximately 630 meters in 1954 (E), extended to approximately 950 meters in 1980 (E').

In 1954, most of the area between the railroad and the Aguán River was pasture (F) with smaller areas of cropland (G). Much of the pasture occupied abandoned cropland, and areas of abandoned pasture had reverted to brush cover (H) (it is likely that brush areas were also grazed).

In recent years, both the town of Tocoa (D') and its surrounding landscape have changed dramatically. Tocoa grew both in area and population, estimated in 1980 at 7100-7500 persons. Much of the pasture and brush land were converted to oil palm groves (I'), owned and managed by local farm cooperatives. Pastures (F') decreased in total area, but increased in quality and average size (from approximately 3 hectares in 1954 to over 8 hectares in 1980). Cropland (G') increased moderately in area, but significantly in quality and levels of management; the average field size increased from 0.5 ha in 1954 to 1.5 ha in 1980. Crop fields are intensively cultivated and typically occupy lower sites along the rivers, unlike the more extensive and permanent oil plam groves set back from the river.

The temporal decrease in forest and brush is a result of clearing and conversion to crop, pasture and oil palm grove land uses. Currently, most of the remaining forests (A') cover the steep mountain slopes; little forest remains in the valley.

Zamora

The Zamora photos (Plate 2) show a 5.22 km segment of new road (1980), the Aguán River and its surrounding valley landscapes. A significant difference between the 1954 and 1980 photos is the course of the meandering Aguán River, as well as the dramatic expansion of both agricultural and urban development.

The area bounded by the river channel in 1954 and 1980 was predominately forest land in 1954 (A). Subsequently, this area has been almost totally cleared and cultivated (A'), and is accessible to Zamora and the new road as a result of river channel change. Due to the dynamics of the river, this area is subject to periodic flooding; much of this area has at one time been cultivated but some has reverted to shrub through abandonment.

On the drier soils of the flood plain, oil palm (B') and citrus groves (C') have been introduced and contribute to the valley's noticeable development changes. Extensively forested areas in 1954 (D), between Zamora and the mountains, have been cleared for crop and pasture lands (D'). Some of this area

is also brush covered, following clearing, cultivation, and abandonment. It is believed, however, that much of the brush lands are also grazed, and there is some evidence of rotation between crop, pasture and brush lands.

In 1954 the cultivated fields, principally on wetter soils near the river (E), were small as is characteristic of a shifting, subsistence economy. The smallest fields, cleared by slash and burn techniques, averaged less than 0.3 hectares; larger fields on level, drier soils, averaged approximately 2.4 hectares in area. In recent years, both field sizes and total cultivated area have increased; today, small fields (E'), likely subsistent and located on the lowest and wettest soils, average 1 hectare; larger field (F') cultivated on drier, level soils average over 10 hectares.

Along with the expansion and development of a stabilizing agricultural landscape, there has occurred significant changes in the urban and built-up areas. The town of Zamora (G) consisted of only a few houses along the abandoned railroad bed in 1954 and had an estimated population of less than 75-100 persons. Following completion of the new road and the subsequent land use changes, Zamora (G') became an identifiable community. Today, its estimated population is 1,800-2000 persons.

A second settlement, La Concepción, is located near the base of the mountains (H). In 1954, this small community surrounded by forest and brush lands had an estimated population of less than 100 persons. In 1980 (H'), however, agricultural lands formed its northern edge, a development complex was sited on its southeast edge, and its population increased to a potential estimate of 750-1,000 persons.

SUMMARY

Construction of Sabã-Tocoa-Corocito Road in 1973 has resulted in extensive land development, improved quality of life and new economic opportunities for the inhabitants of the Aguán Valley. Land use changes, as well as economic and settlement patterns, have been dramatic in the areas analyzed over the past 26 years. The landscape changed from a predominantly forested valley with shifting and subsistence agriculture to a planned and managed agricultural valley based on commercial oil palm groves, livestock, and expanded crop cultivation. Small settlements became towns with infrastructure and services to support the regional developments and increased populations.

SUMMARY OF LAND USE/LAND COVER CHANGES
1954-1980

Land Use/Land Cover	Photo Plate 1 Tocoa 1954	1980	Net Change in hectares	Photo Plate 2 Zamora 1954	1980	Net Change in hectares
Forest	32%	18%	-443	67%	6%	-1906
Brush/Scrub	11%	2%	-266	4%	22%	+ 555
Pasture	43%	33%	-313	15%	22%	+ 265
Cropland, Cultivated	11%	19%	+231	9%	22%	+ 390
Oil Palm Groves	-	17%	+518	-	19%	+ 595
Citrus Groves	-	-	-	-	1%	+ 19
Urban/built-up	3%	11%	+275	0.6%	4%	+ 102
River	-	-	-	4.4%	4%	- 18
	100%	100%		100%	100%	

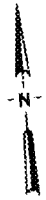
EARTH SATELLITE CORP
7222 47th Street (Chevy Chase)
Washington, D.C. 20015

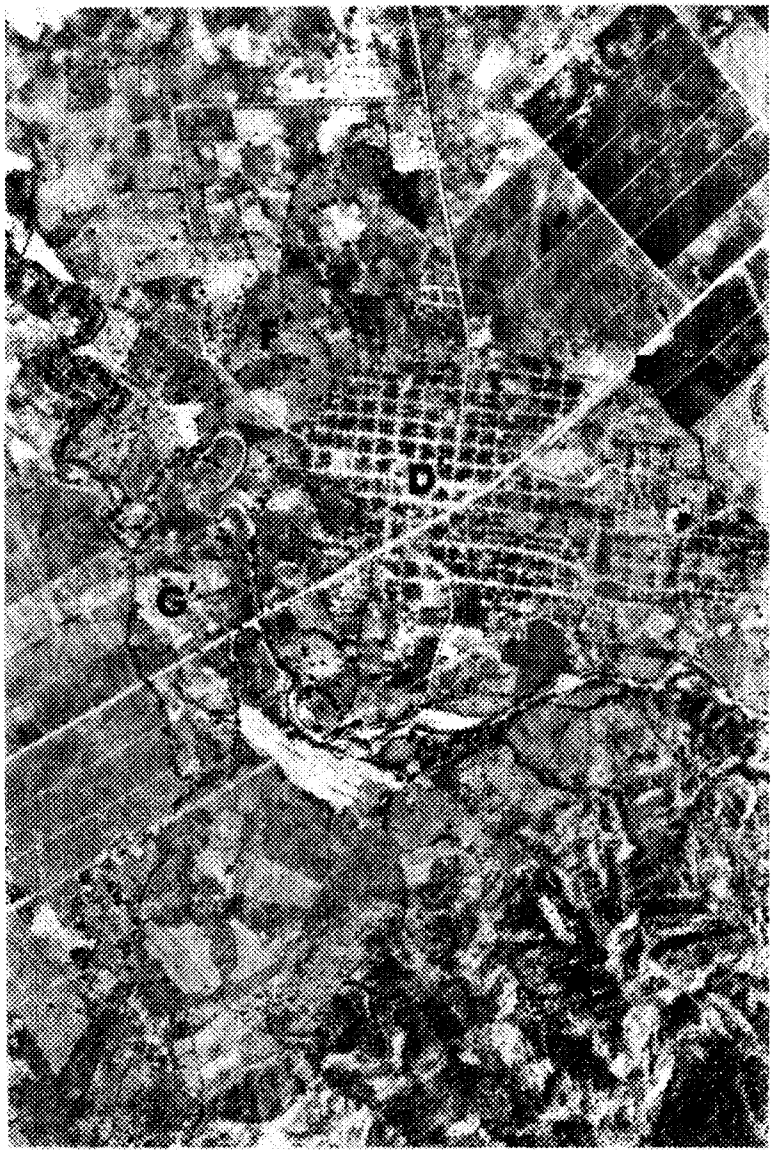
Plate 1

LAND USE CHANGE ANALYSIS

AGUAN RIVER VALLEY – TOCOA, HONDURAS

1954





1980

0 1 2 3 km

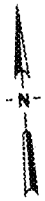
EARTH SATELLITE CORP
7222 47th Street (Chevy Chase)
Washington, D.C. 20015

Plate 2

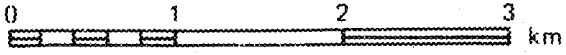
LAND USE CHANGE ANALYSIS

AGUAN RIVER VALLEY -- ZAMORA, HONDURAS

1954



1980



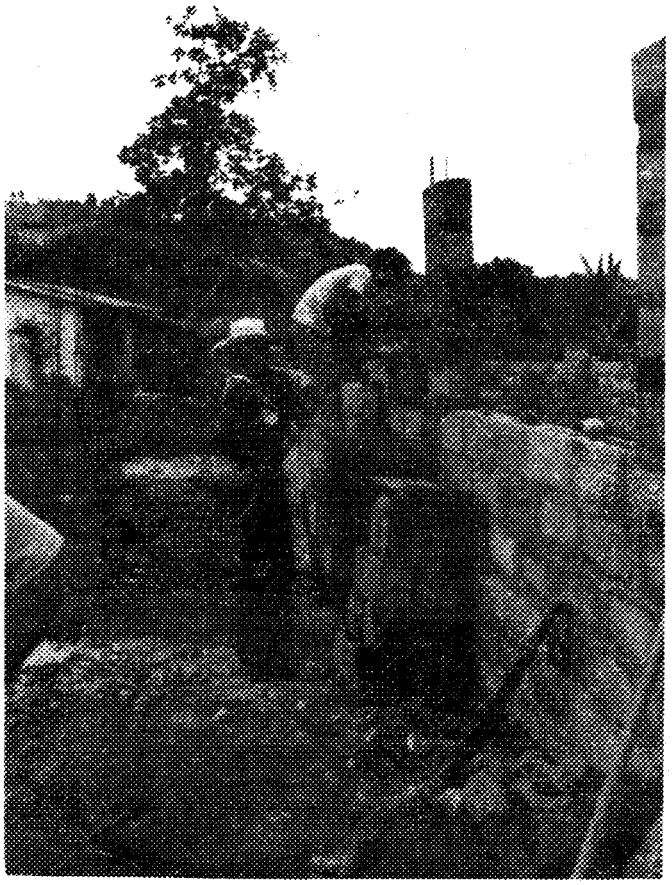
APPENDIX D

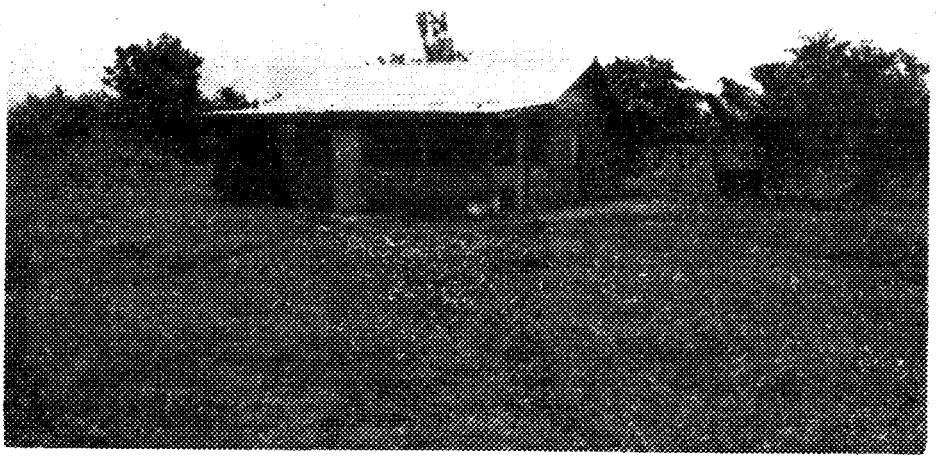
PHOTOGRAPHS

THANKS TO THE NEW FEEDER ROAD IN THE LOWER AGUÁN VALLEY, COOPERATIVES CAN TRANSPORT THEIR OIL PALM FRUIT TO PROCESSING PLANTS.

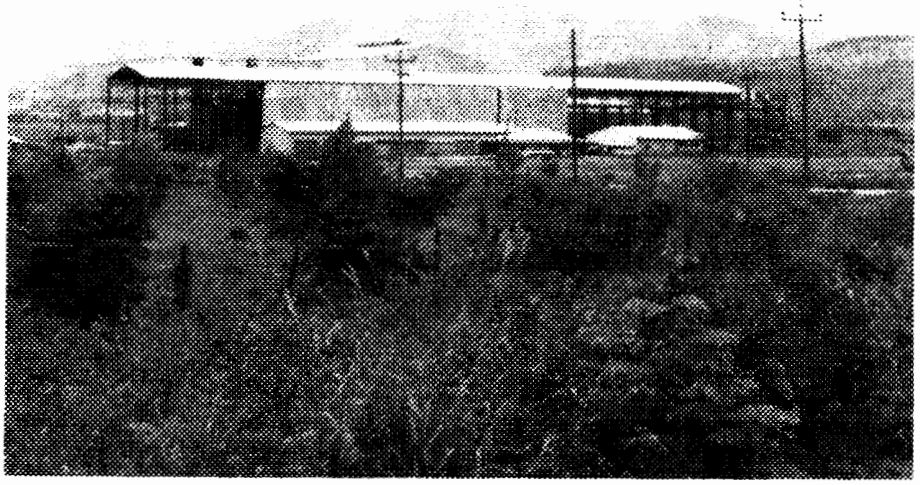
SOME ACCESS ROADS PASS THROUGH VILLAGES ENROUTE TO COOPERATIVE FIELDS. THE TEAM FOUND THAT THE IMPACT OF THESE ROADS IS GENERALLY GREATER THAN FOR THOSE ROADS THAT GO DIRECTLY TO FARMS.

THE ACCESS ROADS PROJECT WAS DESIGNED TO MAKE IT PROFITABLE FOR COOPERATIVES TO GROW CASH CROPS IN PREVIOUSLY ISOLATED FIELDS LIKE THIS ONE.

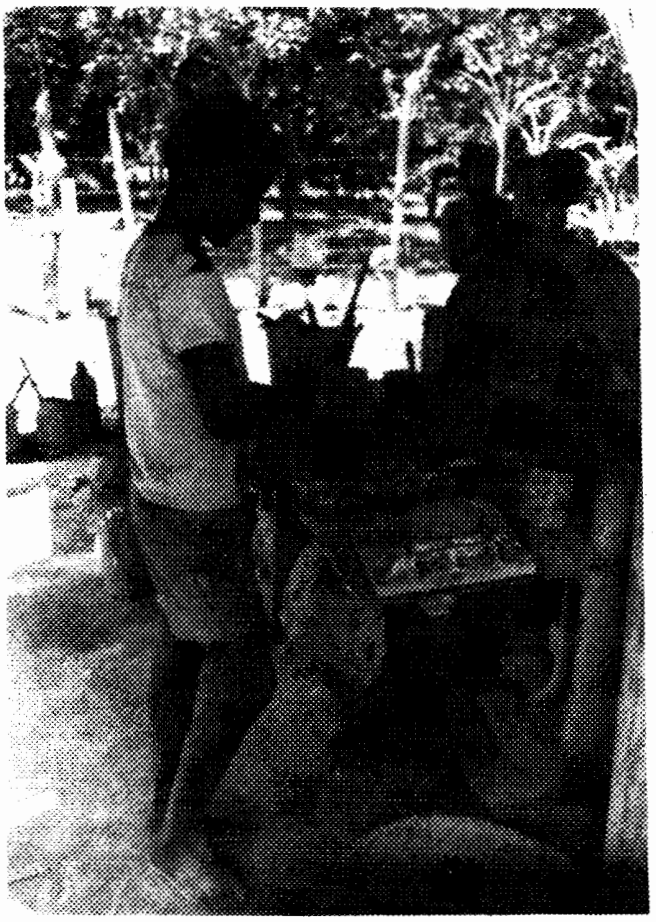




SINCE ACQUIRING ACCESS AND FEEDER ROADS, COOPERATIVES HAVE BUILT SCHOOLS (TOP PHOTO) AND MEETING HALLS (LOWER PHOTO).

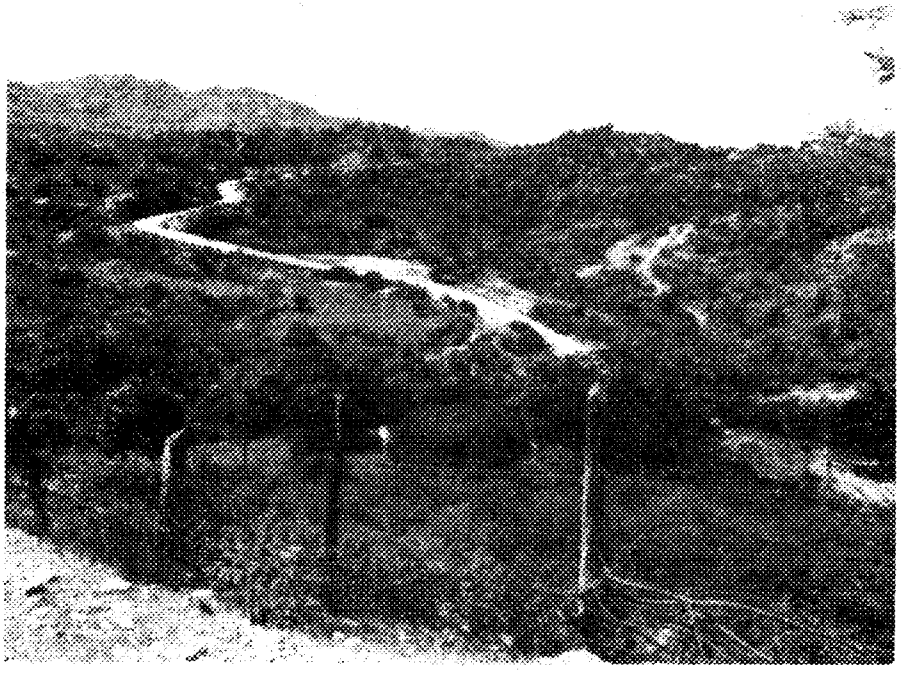


AFTER COMPLETION OF THE ROAD RUNNING BETWEEN VILLA DE SAN FRANCISCO AND SAN JUAN DE FLORES, LOCAL FARMERS SUCCESSFULLY LOBBIED FOR THIS SUGAR MILL.



THIS BOY IS WORKING IN A SMALL TILE FACTORY THAT BEGAN PRODUCTION AFTER CONSTRUCTION OF THE FEEDER ROAD THROUGH TOCOA IN THE LOWER AGUÁN VALLEY.

THIS CONCRETE RIVER FORD SHOWS THE GENERALLY GOOD CONSTRUCTION AND MAINTENANCE OF THE FEEDER ROADS.



THIS ROAD, WINDING ITS WAY THROUGH THE HIGHLAND COUNTRY BETWEEN MARAITA AND YAUYUPE, IS WELL BUILT. BUT WITHOUT COLLATERAL EFFORTS TO SPUR GREATER PRODUCTION OF CASH CROPS OR TIMBER, DEVELOPMENT IN THE REGION HAS BEEN NEGLIGIBLE. ROAD USAGE HAS NOT INCREASED SINCE 1974, WHEN THE AVERAGE TRAFFIC COUNT WAS SEVEN VEHICLES DAILY.

No. 10: Tunisia: Care Water Projects (October 1980)
No. 11: Jamaica Feeder Roads: An Evaluation (November 1980)
No. 12: Korean Irrigation (December 1980)
No. 13: Rural Roads in Thailand (December 1980) PN-AAH-970
No. 14: Central America: Small Farmer Cropping Systems (December 1980) PN-AAH-977
No. 15: The Philippines: Rural Electrification (December 1980) PN-AAH-976
No. 16: Bolivia: Rural Electrification (December 1980) PN-AAH-978
No. 17: Honduras Rural Roads: Old Directions and New (January 1981) PN-AAH-971

SPECIAL STUDIES

No. 1: The Socio-Economic Context of Fuelwood Use in Small Rural Communities (August 1980)
No. 2: Water Supply and Diarrhea: Guatemala Revisited (August 1980)
No. 3: Rural Water Projects in Tanzania: Technical, Social, and Administrative Issues (November 1980) PN-AAH-974

PROGRAM DESIGN AND EVALUATION METHODS

Manager's Guide to Data Collection (November 1979)

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